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species to the genus *Morphnus* instead of to *Geranoaëtus* is based upon differences in the head of the tarsometatarsus. The length of the tendinous bridge is less in *Morphnus*, as is likewise the development of the outer hypotarsal ridge. The difference is constant though slight. The affinities of the fossil specimen as indicated by these characters are with *Morphnus*.

Distinctive characters of the species are: extreme elongation of the tarsal shaft; weakness of the distal trochleae, which are set less obliquely on the shaft and are less grooved; extreme reduction of the ratio of power arm to resistance arm. In *Aquila* this last-named ratio is .303, in *Morphnus guianensis* it is .171, in the fossil species but .125.

Table of measurements in millimeters of *Morphnus daggetti*, tarsometatarsus:

Total length over all .....	167.0
Transverse diameter of head .....	20.8
Transverse diameter through trochleae .....	22.8
Transverse diameter of shaft .....	9.1
Length of power arm .....	20.6
Ratio of power to weight arm .....	.125

The species is named in honor of Mr. F. S. Daggett, through whose kindness the collections at the Museum of History, Science, and Art have been opened to the writer's inspection.

*Los Angeles, California, August 1, 1915.*

## ESTIMATED AVERAGE AGE OF THE HERRING GULL\*

By JOHN TREADWELL NICHOLS

### INTRODUCTION

AT THE A. O. U. CONGRESS held in Washington in 1914, the writer presented a paper on the proportions of different ages of the Herring Gull, as bearing on the average age which birds of the species reach. The proportion of first year birds was estimated from data gathered by observing gulls from ferry-boats in New York Harbor, supplemented to some extent by observations on Long Island and elsewhere. During the season of 1914-15 more data has been similarly collected, and the results obtained, if not unimpeachable, are believed to be interesting and worthy of publication. They indicate an average age of 16.2 years attained by birds which have reached the second winter, and very high mortality between the first and second winters.

### ARGUMENT

In *Science* for October 25, 1912, page 565, is a suggestive article by W. J. Spillman, of Washington, D. C., entitled "A Method of Determining the Average Length of Life of Farm Equipment", in which it is shown that in dealing with a constant population of either inanimate or animate objects, "if we divide the total number of objects of all ages . . . by the average number in their first year the quotient will be the average length of life that those now in their first year will live". By this formula the numbers of first-winter Herring Gulls divided into the total Herring Gull population gives their average length of life. First-year Herring Gulls are dark in plumage, readily separable from second year or

\*Read at the A. O. U. Congress, San Francisco, May 18, 1915.

older birds. To get their approximate average length of life, it is then only necessary to make a sufficiently large count of young and old birds, so that the proportion may be approximately correct for the whole Herring Gull population. During the winter of 1913-14 this was attempted. Second-winter Herring Gulls are in an intermediate plumage easy to identify, and, as the length of life before count of the group one is studying has nothing to do with the working of the formula, during the season 1914-15 an attempt was made to determine the proportion of second-winter birds to those of that age or over, from which the length of life of second-year birds could be computed.

The Herring Gulls observed in New York Harbor are a mixed lot representing all ages and plumages. In the fall the first-winter birds are uniformly dark, the second-winter birds much paler, with white rumps, and all others have grey mantles and white tails. The tendency of birds of an age to flock together, sometimes marked on adjacent ocean shores, is not noticeable here.

In the season of 1913-14, 58 counts of the proportion of first-year birds to the total were made. Out of a total of 7794, 1294 were in their first year. Dividing, we get 6.0 for the proportion of total to young. That is, first year birds will live to an average age of 6.0 years.

In the season of 1914-15, 46 counts of the proportion of second-year Herring Gulls to the total (excluding first-winter birds) were made. Out of a total of 3267, 215 were in their second year. Dividing we get 15.2 for the proportion of total to young. That is, second-year birds will live on the average 15.2 years, or to an age of 16.2 years.

It is at once apparent that the mortality between first and second winters is very high, amounting to about 66 percent. It will be noted that the same year's brood was dealt with as second-winter in 1914-15 which was dealt with as first winter in 1913-14.

The personnel of the flocks is constantly changing, as often on one day one sees twice as many as on the day previous, and a bird with peculiar plumage, perhaps some rare species, has often been looked for, but never seen a second time. In estimating proportions the writer has made actual count each day of birds of different plumages, so far as possible (it is not entirely possible) avoiding repetition in a count, and added together the figures obtained on all the days when count was made. Doubtless many individuals were counted on more than one day, and the figures obtained must be too high for the actual number of individuals observed, but this should not affect the proportions. The plumages vary somewhat, but at this season there is seldom hesitation in placing any individual in one of the three categories (first-winter, second-winter, adult). Through the winter young birds become gradually lighter and after about March 1 there is more change. There seems to be much variation in the persistence of the dark plumage in spring, and the percentage of puzzling plumages increases, so that during the second season, 1914-15, no attempt at count after March 1 was made. Chance determinations of plumages were omitted, as of a few birds flashing white in a distant flock which might contain undeterminable young birds,—and thus one probability of error in proportions has been avoided.

#### CHANCES OF ERROR

The formula followed is true only of fixed populations; if the Herring Gull population is increasing notably the number of young birds will be larger than normal and the determined average age too low. The same is true if the 1913 brood of young was for any reason an abnormally large one.

If the plumages have not been correctly diagnosed the results will be thrown into error. This might be, if some first-year birds wore second-year plumage, which is unlikely, as if so there would be more intermediates between typical first- and second-year plumages in the fall than one actually does find. That some older birds wear second-year plumage, or second-year birds adult plumages seems more probable, but here the error should fall on one side as frequently as on the other and make no difference in the final results.

It is possible that the counts are not sufficiently great to give the true proportions. Larger counts would of course be more reliable; but in the writer's opinion those made are sufficiently large for approximate accuracy.

If the habits of young and old vary so that any age favors the region where the observations were made more than the others, this would result in an erroneous proportion being obtained. Familiarity with the Herring Gull in various parts of its winter range leads the writer to believe that young or old do somewhat favor certain regions, but that the point where the observations were made is not such a region and that the counts are representative.

#### SUMMARY

In view of the difficulties of successfully estimating the age which a species of bird reaches in nature, an estimate based on the proportion of young to old is of interest. To repeat, such an estimate from two season's observation of the Herring Gull gives average age attained by first-winter birds 6.0 years, second-winter birds 16.2 years, which implies a very heavy mortality between the first and second winters. Very likely the mortality continues heavy for another year or more and the normal age of the species is distinctly greater than the average age reached by second-winter birds, perhaps between 15 and 20 years, but this is mere guess-work.

The writer considers the method here used one of the best, when available for determining age; but results obtained with it by one observer in one locality in so short a time can not be greatly relied upon.

*New York City, June 11, 1915.*

### A LATE NESTING RECORD FOR THE CALIFORNIA WOODPECKER\*

By HARRIET WILLIAMS MYERS

FOR TWO seasons, at least, the same hole in a telephone pole that is daily passed by hundreds of street cars and automobiles, has been the home of a pair of California Woodpeckers (*Melanerpes formicivorus bairdi*). There are plenty of oak and other trees nearby, but the birds seem to have a fondness for this pole which is near a group of poles on the corner of Pasadena Avenue and Avenue 62, Los Angeles, only a short distance from the Arroyo Seco. The hole is about thirty feet from the ground and is badly worked and split down. From a small round opening it has become an almost square one nearly twice as large as needed.

While nesting birds have been recorded for every month in the year in California, I had thought July to be the latest for these woodpeckers, and was, therefore, rather surprised to find that this nest-pole contained squealing young on September 11. It was after six o'clock that I passed near the corner on this day

\*Read at the A. O. U. Congress, San Francisco, May 18, 1915.